Operating Instructions
Non-Contact Safety Switch
CET.-AR-...-CH-... (Multicode)

Contents

Scope **3**
Correct use **3**
Possible combinations for CES components 4
Exclusion of liability and warranty **4**
General safety instructions **5**
Function **6**
Function of the electronics 6
Function of the guard locking 8
Start button and feedback loop (optional) 9
Mechanical release and mechanical key release (can be retrofitted) 9
Emergency unlocking (can be retrofitted) 10
Escape release (optional) 11
Wire front release (optional) 12
Lockout mechanism (optional) 13
Changing the approach direction **14**
Mounting **15**
Electrical connection **17**
Safety in case of faults 18
Fuse protection for power supply 18
Requirements for connection cables 19
Maximum cable lengths 20
Connector assignment safety switch CET-AR with plug connectors 2 x M12 22
Connector assignment safety switch CET-AR with plug connector RC18 23
Connector assignment Y-distributor 24
Connection of a single CET-AR 25
Connection of several CET-AR in a switch chain 28
Setup **35**
LED indicators 35
Initial setup 35
Functional check 36
System status table **37**
Technical data **38**
Technical data for safety switch CET.-AR-C..-CH-... 38
Dimension drawing safety switch CET-AR-... 40
Technical data for actuator CET-A-BWK-50X 42
Ordering Information and Accessories **43**
Versions with plug connectors 2 x M12 43
Connection cables M12 and accessories for series connection 44
Versions with plug connector RC18 45
Connection cables RC18 46
Accessories 46
Inspection and service **47**
Service **47**
Declaration of conformity **48**

Scope

These operating instructions are valid for all CET.-AR-...-CH-... versions. These operating instructions and the enclosed data sheet form the complete user information for your device.

Correct use

The safety switch CET-AR is an electromagnetic interlock device with guard locking.

The safety switch CET-AR can be integrated into an AR switch chain or operated as a separate system.

In combination with a safety guard and the machine control, this safety component prevents the safety guard from being opened while a dangerous machine movement is being performed.

For the control system, this means that

- starting commands which cause hazardous situations must become active only when the safety guard is in protective position and the guard locking is in locked position. The locked position of the guard locking must be released only when the hazardous situation is no longer present.

Before safety components are used, a risk assessment must be performed on the machine in accordance with

- EN ISO 13849-1, Safety of machinery. Safety related parts of control systems. General principles for design, Annex B
- EN ISO 12100, Safety of machinery – General principles for design – Risk assessment and risk reduction.
- IEC 62061, Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems

Correct use includes compliance with the relevant requirements for installation and operation, in particular

- EN ISO 13849-1, Safety of machinery. Safety related parts of control systems. General principles for design
- EN 1088, Safety of machinery. Interlocking devices associated with guards. Principles for design and selection
- EN 60204-1, Electrical equipment of machines

The safety switch is only allowed to be operated in conjunction with the intended EUCHNER CET actuators and the related connection components from EUCHNER. On the use of different actuators or other connection components, EUCHNER provides no warranty for safe function.

Connection of several devices in an AR switch chain is permitted only using devices intended for series connection in an AR switch chain. Check this in the instructions of the device in question.

A maximum of 20 safety switches are allowed to be operated in a switch chain.

Important:

- The user is responsible for the integration of the device into a safe overall system. For this purpose, the overall system must be validated, e.g. in accordance with EN ISO 13849-2.
- Correct use requires observing the permissible operating parameters (see Technical data).
- If a product data sheet is included with the product, the information on the data sheet applies in case of discrepancies with the operating instructions.
- In the estimation of the PL for the overall system, a maximum value of 100 years can be assumed for the $MTTF_d$ according to the limit value in EN ISO 13849-1:2008, section 4.5.2. This corresponds to a minimum value for the PFH_d of 2.47 x 10^{-8}/h. When up to 11 devices are connected in series, these limit values can be assumed for the entire switch chain as a subsystem. As a subsystem, this switch chain achieves PL e. If more than 11 devices are connected in series, the PFHd can be calculated using one of the methods stated in EN ISO 13849-1:2008, Section 4.5.1.
- If the simplified method according to Section 6.3 of EN ISO 13849:2008-12 is used for validation, the Performance Level (PL) might be reduced when more than 11 devices are connected in series.
- It is only allowed to use components that are permissible in accordance with the table below.

Possible combinations for CES components

Safety switch	Actuator **CET-A-BWK-50X** 096327
CET.-AR-...-CH-...	●

Key to symbols	●	Combination possible

Note:

For information about combination with an AR evaluation unit, please refer to the section *Information on operation on an AR evaluation unit on page 32*.

Exclusion of liability and warranty

In case of failure to comply with the conditions for correct use stated above, or if the safety instructions are not followed, or if any servicing is not performed as required, liability will be excluded and the warranty void.

General safety instructions

As the unique actuator codes are not evaluated, the CET.-AR-...-CH-... version can only be used for applications in which a hazard cannot result from possible tampering with the system.

Safety switches fulfill personal protection functions. Incorrect installation or tampering can lead to fatal injuries to personnel.

Check the safe function of the safety guard particularly

- after any setup work
- after the replacement of a CET component
- after an extended period without use
- after every fault

Independent of these checks, the safe function of the safety guard should be checked at suitable intervals as part of the maintenance schedule.

Warning!

Danger of fatal injury in the event of incorrect connection or incorrect use.
- Safety switches must not be bypassed (bridging of contacts), turned away, removed or otherwise rendered ineffective. On this topic pay attention in particular to the measures for reducing the possibility of bypassing from EN 1088:1995+A2:2008, Section 5.7.

The device is only allowed to be installed and placed in operation by authorized personnel
- who are familiar with the correct handling of safety components
- who are familiar with the applicable EMC regulations
- who are familiar with the applicable regulations on health and safety and accident prevention
- who have read and understood the operating instructions.

Important:

Prior to use, read the operating instructions and keep these in a safe place. Ensure that the operating instructions are always available during mounting, setup and servicing work. EUCHNER cannot provide any warranty in relation to the readability of the CD for the storage period required. For this reason you should archive a printed copy of the operating instructions. You can download the operating instructions from www.EUCHNER.de.

Function

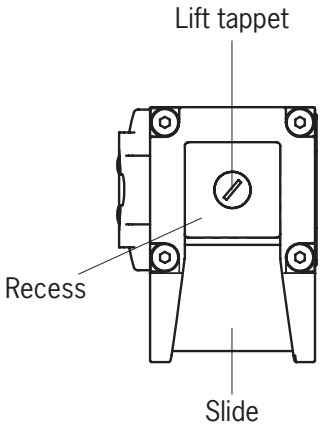
Function of the electronics

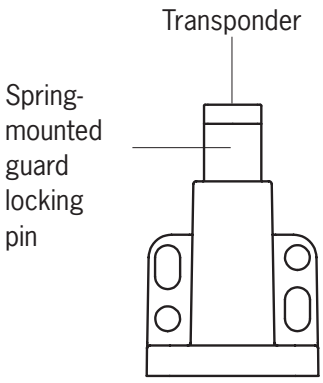
Safety switches series CET-AR permit locking of movable safety guards. They meet the following safety requirements:

- Category 3, PLe according to EN ISO 13849-1 (head mounted upward)
- Category 4, PLe according to EN ISO 13849-1 (head mounted downward or horizontal)
- Redundant design of the circuit in the unit with self-monitoring
- The safety system still functions even if an internal component fails
- The switch state of the semiconductor outputs is continuously monitored internally
- Short circuit detection at the safety outputs by pulse signals

The following switch-on condition applies to safety outputs OA and OB (see also *System status table* and the section *Typical system times*):

- Safety guard closed
- Guard locking active (actuator completely inserted into recess)
- Both safety outputs (IA and IB) must be on
- Feedback loop closed (only for version with feedback loop/start button)





The system consists of the following components: coded actuator (transponder) and switch.

Each actuator has a unique electronic coding and is therefore a unique element. The code in an actuator cannot be reprogrammed.

Unlike systems with unique code detection, on multicode devices a specific code is not requested but instead it is only checked whether the actuator is of a type that can be detected by the system (multicode detection). There is no exact comparison of the actuator code with the code defined in the safety switch (unique code detection).

The safety switch with integrated evaluation unit and read head is fastened to the fixed part of the safety guard.

The actuator attached to the movable part of the safety guard is moved towards the read head fitted in the safety switch by closing the door. When the switch-on distance is reached, power is supplied to the actuator by the inductive read head and data can be transferred.

If a permissible code is detected, the safety outputs are released.

Due to the combination of dynamic polling of the actuator and the redundant, diverse design of the safety electronics with the two feedback safety outputs, the safety switch will enter the safe state with every detectable fault.

When the safety guard is opened, the safety outputs switch off the safety circuit and the monitoring output OUT is switched off. The state of the safety outputs is monitored internally by two microprocessors.

In the event of a fault in the safety switch, the safety circuit is switched off and the DIA LED illuminates red.

The safety switch has a redundant circuit design with self-monitoring. This means that the safety system is still effective even if a component fails.

The system is designed so that failures will not result in the loss of the safety function. The occurrence of failures is detected by cyclic self-monitoring at the latest on the next demand to close the safety contacts (e.g. on starting).

Function of the guard locking

Version CET1-AR, guard locking by spring force

The lift tappet is pressed into the locked position by the force of the spring for the guard locking pin in the actuator and unlocked electromagnetically by the safety switch. The guard locking functions in accordance with the closed-circuit current principle. The locked safety guard cannot be opened immediately in the event of interruption of the power supply to the solenoid.

The guard locking pin of the actuator cannot be moved out of the recess and the door is locked in the closed position as long as the lift tappet is pressed down by the actuator.

When the operating voltage is present at the locking solenoid, the lift tappet is extended and lifts the actuator's guard locking pin above the edge of the recess. The safety door can then be opened.

Version CET2-AR, guard locking by solenoid force

Important:

The safety guard can be opened immediately in the event of interruption of the solenoid power supply! Usage only in special cases in accordance with strict evaluation of the accident risk (see DIN EN 1088 (1995), section 5.5)!
Example: If the risk of accidental locking inside a safety guard during a power failure is higher than the risk of ineffective guard locking.

The lift tappet is held in locked position by electromagnetic force and released by spring force. The guard locking operates in accordance with the open-circuit current principle.

The safety door can be opened as long as the lift tappet is held in the extended position.

The lift tappet is released when operating voltage is present at the guard locking solenoid. The actuator's guard locking pin can now press the lift tappet down. The safety door is locked as soon as the guard locking pin is fully inserted into the recess.

Version CET3-AR, guard locking by spring force with door monitoring output

Function as for CET1-AR, however here the door position is also monitored. The door monitoring output OUT D is switched on as soon as the actuator protrudes beyond the extended lift tappet (state: door closed, guard locking not active). The output OUT D also remains switched on when guard locking is active.

Version CET4-AR, guard locking by solenoid force with door monitoring output

Function as for CET2-AR, however here the door position is also monitored. The door monitoring output OUT D is switched on as soon as the actuator protrudes beyond the extended lift tappet (state: door closed, guard locking not active). The output OUT D also remains switched on when guard locking is active.

Start button and feedback loop (optional)

A start button and a feedback loop can be connected (for monitoring downstream relays and contactors).

Important:

Faults on the start button are not detected. This can lead to unintentional automatic starting.

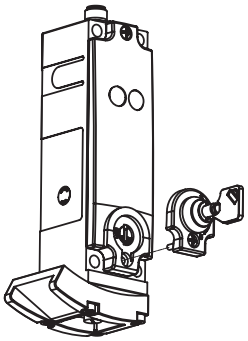
On devices with start button and feedback loop, safety outputs OA and OB are switched on only when the start button is pressed and the feedback loop is closed. Start button and feedback loop must be closed for at least 500 ms.

Monitoring output OUT is switched on as soon as guard locking is active. The status of the feedback loop has no influence on this (see section *System status table*).

Mechanical release and mechanical key release (can be retrofitted)

Important:

- The mechanical release is not a safety function.
- The machine manufacturer must select and use a suitable release (escape release, emergency unlocking, etc.) for a specific application. A risk assessment appraisal is required for this purpose. It may be necessary to take specifications from a product standard into account.
- The mechanical key release must not be used to lock the switch during maintenance work to prevent activation of guard locking, for example.
- The correct function must be checked at regular intervals.
- Loss of the release function due to mounting errors or damage during mounting.
- Check the release function every time after mounting.
- Loss of the release function due to tension on the actuator. The door must not be under tension during release.
- Please observe the notes on any enclosed data sheets.



The mechanical release can be used to unlock guard locking, irrespective of the state of the solenoid.

Using mechanical release

1. Unscrew locking screw
2. Using a screwdriver, turn the mechanical release by around 180° in the direction of the arrow

➡ The safety device can be opened

The mechanical release must be returned to its original position and sealed after use (for example with sealing lacquer).

Using mechanical key release

On devices with mechanical key release (can be retrofitted), simply turn the key to unlock. For mounting, see the mechanical key release supplement.

The monitoring output OUT is switched off; OUT D can assume an undefined state. Open the safety door and close it again after resetting the mechanical release. The device will then operate normally again.

Emergency unlocking (can be retrofitted)

Important:

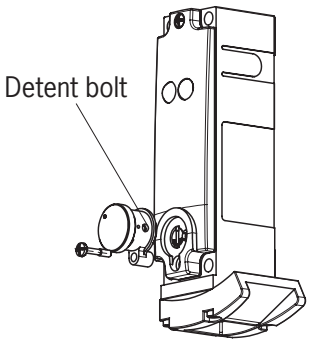
- Emergency unlocking is not a safety function.
- The machine manufacturer must select and use a suitable release (escape release, emergency unlocking, etc.) for a specific application. A risk assessment appraisal is required for this purpose. It may be necessary to take specifications from a product standard into account.
- The correct function must be checked at regular intervals.
- Loss of the release function due to mounting errors or damage during mounting.
- Check the release function every time after mounting.
- Loss of the release function due to tension on the actuator. The door must not be under tension during release.
- Please observe the notes on any enclosed data sheets.

Emergency unlocking can be used to unlock guard locking, irrespective of the state of the solenoid. For mounting, see the mounting supplement.

Using emergency unlocking

Important:

The door must not be under tension when emergency unlocking is actuated.



- Turn emergency unlocking clockwise until it clicks into place.

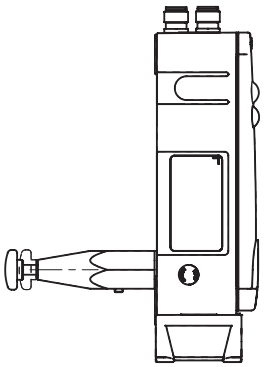
➡ The safety device can be opened

To reset, press the detent bolt inward using a small screwdriver or similar tool and turn the emergency unlocking back.

The monitoring output OUT is switched off; OUT D can assume an undefined state. Open the safety door and close it again after resetting emergency unlocking. The device will then operate normally again.

Escape release (optional)

Important:



- The escape release is not a safety function.
- The machine manufacturer must select and use a suitable release (escape release, emergency unlocking, etc.) for a specific application. A risk assessment appraisal is required for this purpose. It may be necessary to take specifications from a product standard into account.
- The correct function must be checked at regular intervals.
- Loss of the release function due to tension on the actuator. The door must not be under tension during release.
- Please observe the notes on any enclosed data sheets.

The escape release is used to open a locked safety guard from the inside (see *dimension drawing* in the section *Technical data*).

Fit escape release such that operation, inspection and maintenance are possible.

Using the escape release

- Press the red release knob to the stop

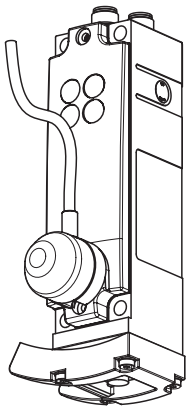
➡ The safety device can be opened

Pull the knob out again to reset.

The monitoring output OUT is switched off; OUT D can assume an undefined state. Open the safety door and close it again after resetting the escape release. The device will then operate normally again.

Wire front release (optional)

Important:



- The wire front release is not a safety function.
- The wire front release is non-latching and therefore must not be used as an escape release unless the machine manufacturer itself provides a detent mechanism. The machine manufacturer must select and use a suitable release (escape release, emergency unlocking, etc.) for a specific application. A risk assessment appraisal is required for this purpose. It may be necessary to take specifications from a product standard into account.
- Loss of the release function due to tension on the actuator. The door must not be under tension during release.
- The correct function must be checked at regular intervals.

The wire front release permits remote release of the guard locking via a pull rope. Flexible routing of the pull rope permits release of the guard locking in inaccessible installation situations.

Mounting the wire front release

Important:

- Loss of the release function due to mounting errors, damage or wear.
- Check the release function every time after mounting.
- When routing the wire front release, ensure that it operates smoothly.
- Observe the min. bending radius (100 mm) and minimize the number of bends.
- The switch is not allowed to be opened.
- Observe the notes on the enclosed data sheets.

Lockout mechanism (optional)

Important:

- The lockout mechanism is not a safety function.
- The correct function must be checked at regular intervals.

The lockout mechanism can be used to prevent maintenance personnel from being unintentionally locked in the danger area, for example.

In locked position, the lockout mechanism prevents activation of guard locking. The lockout mechanism can be secured in locking position with up to three locks. The mechanical release can still be used.

Using the lockout mechanism

Important:

Deactivate guard locking and open the safety door before using the lockout mechanism.

Before entering the danger area:

1. Open the door
2. Press button, move lockout mechanism to locking position (Figures A and B) and secure with lock (Figure C)

➡ Guard locking cannot be activated, and it must not be possible to start the machine. Important: Test this before entering the danger area.

Resetting the lockout mechanism:

1. Open the safety door if necessary
2. Remove the lock
3. Move lockout mechanism to basic position (Figure A)

Locking function not active

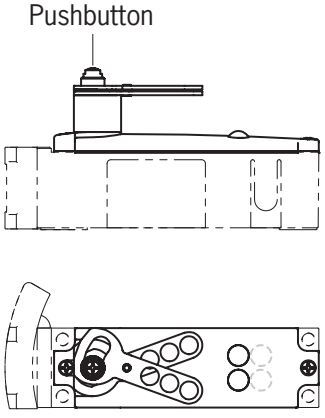


Figure A

Locking function active

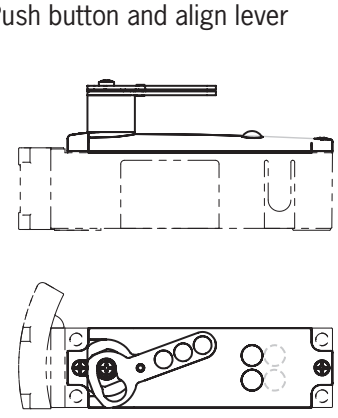


Figure B

Locking function active and secured

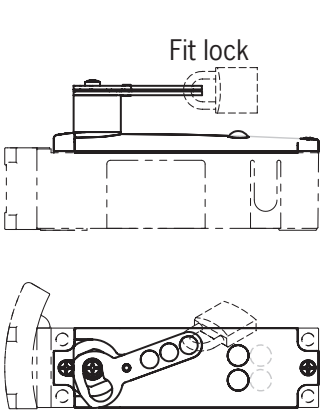
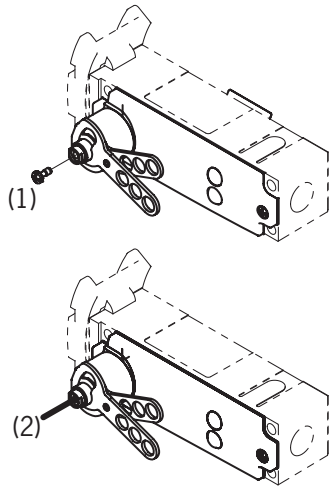


Figure C



Using mechanical release

1. Unscrew locking screw
2. Operate the mechanical release through the threaded bore of the locking screw (e.g. with a metal rod ∅ 3 mm)

➡ The safety device can be opened

The locking screw must be screwed back in and sealed after use (for example with sealing lacquer).

The monitoring output OUT is switched off; OUT D can assume an undefined state. Open the safety door and close it again after resetting the mechanical release. The device will then operate normally again.

Changing the approach direction

1. Remove the screws from the safety switch
2. Set the required direction
3. Tighten the screws with a torque of 1.5 Nm.

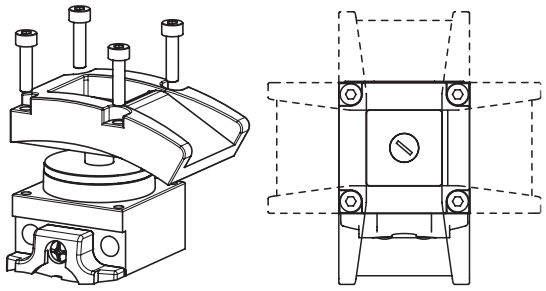


Fig. 1: Changing the approach direction

Mounting

Caution!

Safety switches must not be bypassed (bridging of contacts), turned away, removed or otherwise rendered ineffective.

- On this topic pay attention in particular to the measures for reducing the possibility of bypassing according to EN 1088:1995.A2:2008, sec. 5.7.
- The max. achievable category according to EN 13849-1 depends on the installation position (see technical data).

Caution!

Risk of damage to equipment and malfunctions as a result of incorrect installation.

- Safety switches must not be used as a mechanical end stop. Fit an additional end stop for the movable part of the safety guard.
- Observe the min. door radii (see figure below).
- Ensure that the actuator contacts the slide in the designated area (see figure below). Marks on the slide specify the prescribed approach zone.
- The prerequisite for trouble-free long-term operation is protection of the switch head and the actuator against penetrating foreign objects such as swarf, sand, and blasting shot, etc. The switch should be installed with the actuating head down for this purpose.
- Cover the switch and the actuator during painting work.

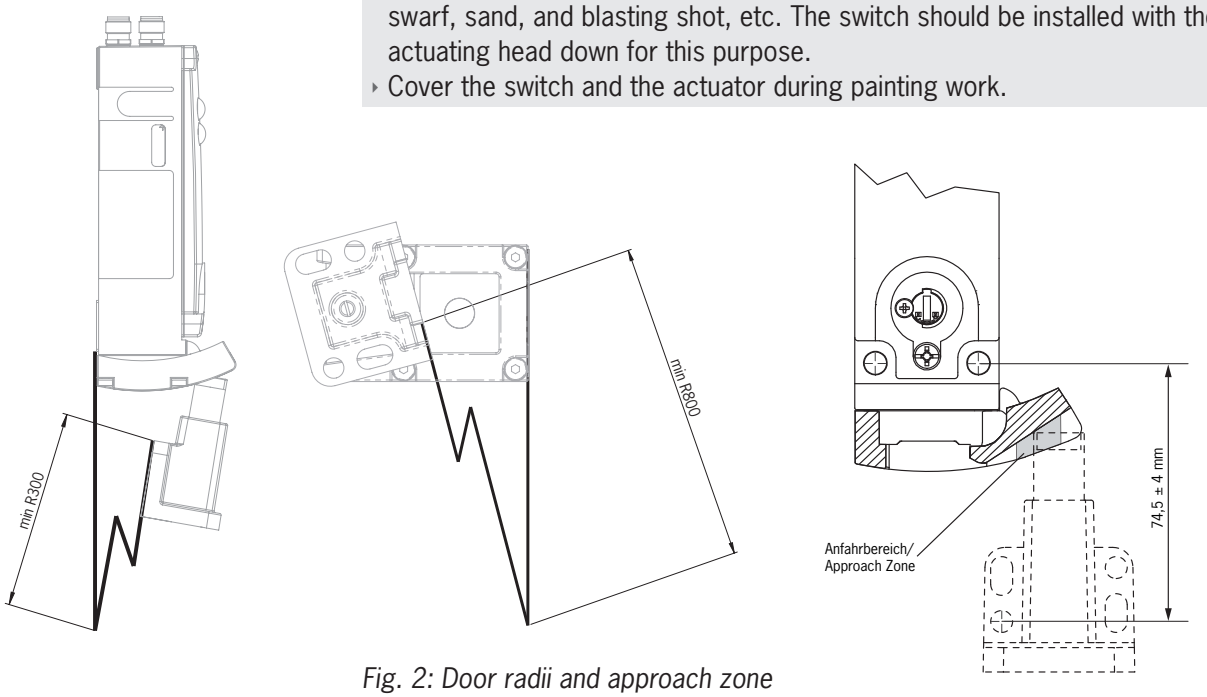
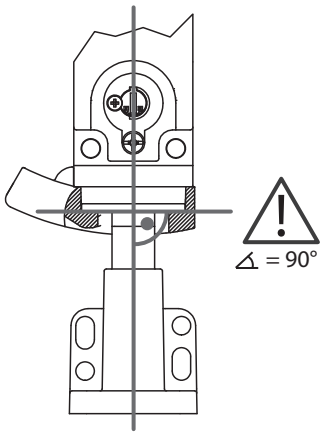
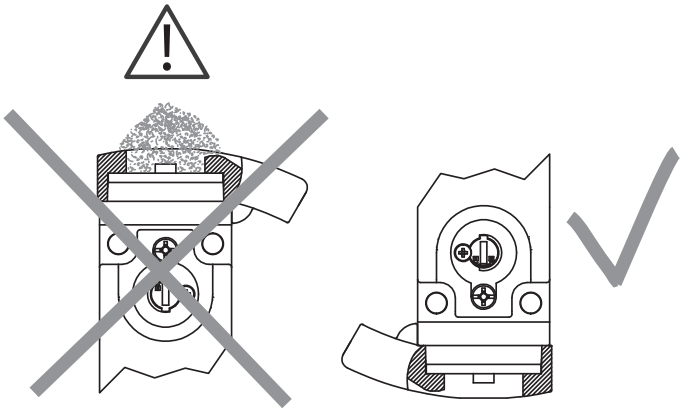


Fig. 2: Door radii and approach zone



Note the following points:

- Actuator and safety switch must be easily accessible for inspection and replacement.
- The switching operation must only be triggered by the specific actuator designated for this purpose.
- Actuator and safety switch must be fitted so that
  - the actuator is positively mounted on the safety guard, e.g. by using the safety screws included.
  - they cannot be removed or tampered with using simple means.
  - the active faces of the actuator and the safety switch are parallel to each other (see figure on the left).
  - the actuator is fully inserted into the switch recess when the safety guard is closed (see figure on the left).
  - no dirt can accumulate in the recess.



Electrical connection

The following connection options are available:

- Separate operation
- Series connection with Y-distributors from EUCHNER (only with M12 plug connector)
- Series connection, e.g. with wiring in the control cabinet.
- Operation on an AR evaluation unit

Warning!

In case of an error, loss of the safety function through incorrect connection.
- To ensure safety, both safety outputs (OA and OB) must always be evaluated.
- The monitoring output OUT and the door monitoring output OUT D are not allowed to be used as safety outputs.
- Lay the connection cables with protection to prevent the risk of short circuits.

Caution!

Risk of damage to equipment or malfunctions as a result of incorrect connection.
- The power supply for the evaluation electronics is electrically isolated from the power supply for the guard locking solenoid.
- The teach-in input and feedback loop, as well as LED 1 and LED 2, have the same ground potential as the guard locking solenoid.
- Do not use a control system with pulsing or switch off the pulsing function in your control system. The device generates its own clock signal on the output lines OA/OB. A downstream control system must tolerate these pulses, which may have a length of up to 1 ms.
  The pulses are also output when the safety outputs are switched off.
  Depending on the inertia of the connected device (control system, relay, etc.), this can lead to short switching processes.
- The inputs on an evaluation unit connected must be positive-switching, as the two outputs on the safety switch deliver a level of +24 V in the switched-on state.
- All the electrical connections must either be isolated from the mains supply by a safety transformer according to IEC 61558-2-6 with limited output voltage in the event of a fault, or by other equivalent isolation measures (PELV).
- For use and operation as per the cULus requirements*, a power supply with the feature “for use in class 2 circuits” must be used. The same requirement applies to the safety outputs.
  Alternative solutions must comply with the following requirements:
  a) Electrically isolated power supply unit with a max. open-circuit voltage of 30 V/DC and a limited current of max. 8 A.
  b) Electrically isolated power supply unit in combination with fuse as per UL248. This fuse should be designed for max. 3.3 A and should be integrated into the 30 V DC voltage section.
- For use and applications as per the cULus requirements*, a connection cable listed under UL category code CYJV/7 must be used and the following requirements met: min. 30 V DC, 2 A, 85 °C. The EUCHNER connection cables in the section *Ordering information and accessories* meet these requirements.

* Note on the scope of the UL approval: The devices are tested according to the requirements of UL508 and CSA/ C22.2 no. 14 (protection against electric shock and fire).

Caution!

- All electrical outputs must have an adequate protective circuit for inductive loads. The outputs must be protected with a free-wheeling diode for this purpose. RC interference suppression units must not be used.
- Power devices which are a powerful source of interference must be installed in a separate location away from the input and output circuits for signal processing. The cable routing for safety circuits should be as far away as possible from the cables of the power circuits.
- In order to avoid EMC interference, the physical environmental and operating conditions at the installation site of the device must comply with the requirements according to the standard EN 60204-1:2006, section 4.4.2 (EMC).
- Please pay attention to any interference fields in case of devices such as frequency converters or induction heating systems. Observe the EMC instructions in the manuals from the respective manufacturer.

Important:

If the device does not appear to function when operating voltage is applied (e.g. green STATE LED does not flash), the safety switch must be returned unopened to the manufacturer.

Safety in case of faults

- The operating voltage U_B and the solenoid voltage UCM are reverse polarity protected.
- The contacts IA/IB and OA/OB are short-circuit-proof
- A short circuit between OA and OB is detected by the switch.
- A short circuit in the cable can be excluded by laying the cable with protection.

Fuse protection for power supply

The power supply must be provided with fuse protection depending on the number of switches and current required for the outputs. The following rules apply:

Max. current consumption of an individual switch I_{max}

I_{max} = I_{UB} + I_{OUT} + I_{OA+OB} (+ $I_{OUT\ D}$*)

I_{UB} = Switch operating current (80 mA)

I_{OUT} = Load current of monitoring outputs (max. 50 mA per monitoring output)

I_{OA+OB} = Load current of safety outputs OA + OB (2 x max. 200 mA)

* only for version with door monitoring output

Max. current consumption of a switch chain ΣI_{max}

ΣI_{max} = I_{OA+OB} + n x (I_{UB} + I_{OUT} (+ $I_{OUT\ D}$*))

n = Number of connected switches

* only for version with door monitoring output

Requirements for connection cables

Caution!

Risk of damage to equipment or malfunctions as a result of incorrect connection cables.
- Use connection components and connection cables from EUCHNER
- On the usage of other connection components, the requirements in the following table apply. EUCHNER provides no warranty for safe function in case of failure to comply with these requirements.

Observe the following requirements with respect to the connection cables:

For safety switch CET-AR with plug connectors 2 x M12

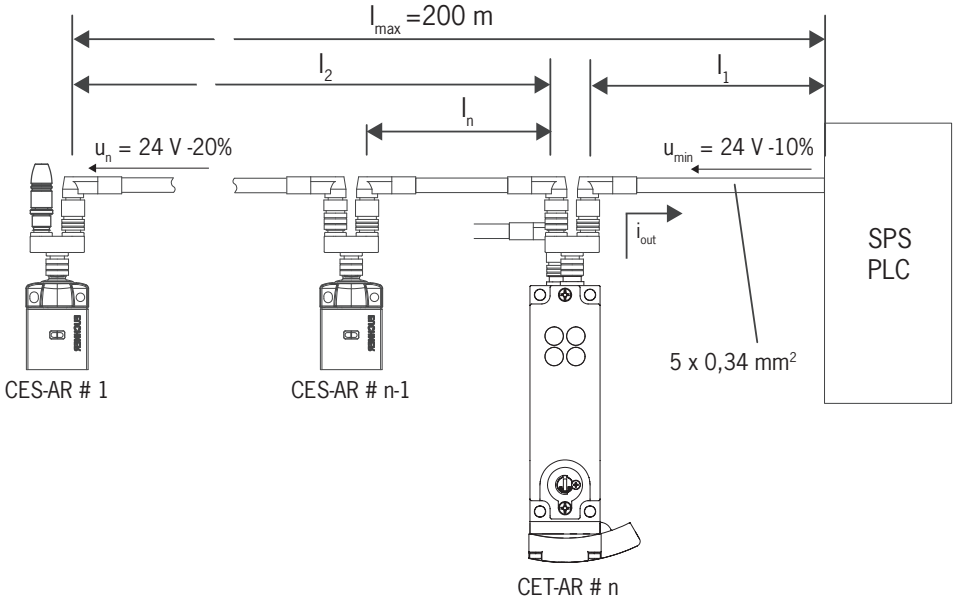
Parameter	Value	Unit
Wire cross-section min.	0.34	mm²
R max.	60	Ω/km
C max.	120	nF/km
L max.	0.65	mH/km
Recommended cable type	LIYY 8x or 5x 0.34 mm²	

For safety switches CET-AR with plug connector RC18

Parameter	Value	Unit
Wire cross-section min.	0.34	mm²
R max.	60	Ω/km
C max.	120	nF/km
L max.	0.65	mH/km
Recommended cable type	LIFY11Y min. 19-cores	

Maximum cable lengths

Switch chains are permitted up to a maximum overall cable length of 200 m taking into account the voltage drop as a result of the cable resistance (see table below with example data and case example).



n Max. number of switches	$I_{OA/OB}$ (mA) Possible output current per channel OA/OB	l_1 (m) Max. cable length from the last switch to the control system
5	10	150
	25	100
	50	80
	100	50
	200	25
6	10	120
	25	90
	50	70
	100	50
	200	25
10	10	70
	25	60
	50	50
	100	40
	200	25

Determining cable lengths using the example table

Example: 6 switches are to be used in series. Cabling with a length of 40 m is routed from a safety relay in the control cabinet to the last switch (#6). Cables with a length of 20 m each are connected between the individual CES-AR/CET-AR safety switches.

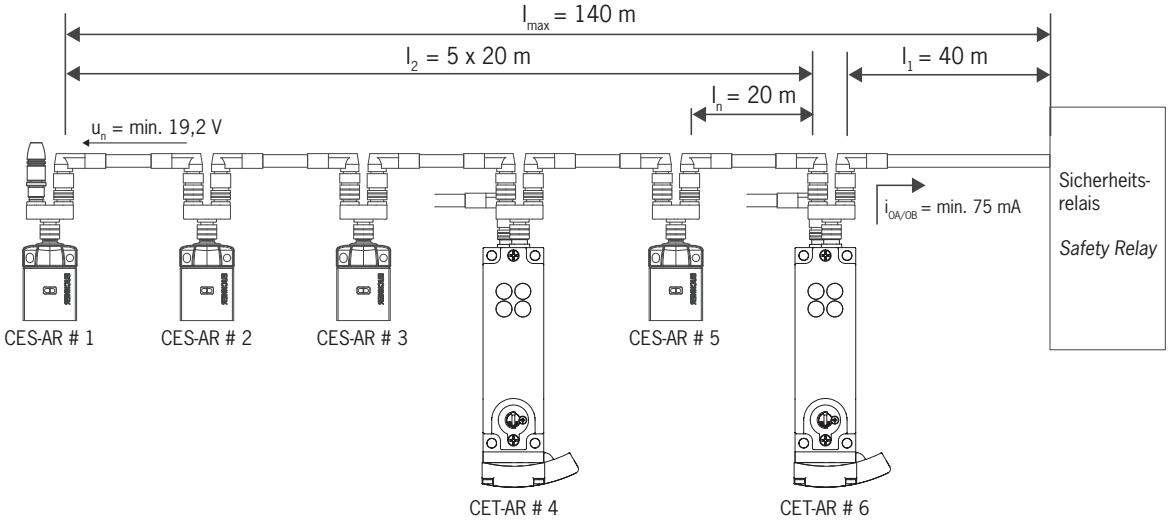


Fig. 3: Circuit example with six CES-AR/CET-AR

A safety relay is connected downstream which consumes 75 mA at each of the two safety inputs. This operates over the whole temperature range with a voltage of 19.2 V (corresponds to 24 V -20%).

All the relevant values can now be determined using the example table:

1. Select the corresponding section in the column n (max. number of switches). Here: 6 switches.
2. In column $I_{OA/OB}$ (possible output current per channel OA/OB), find a current greater than or equal to 75 mA. Here: 100 mA.

➡ It is then possible to determine the maximum cable length from the last switch (#6) to the control system from column l_1. Here: a length of 50 m is permitted.

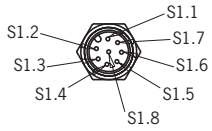
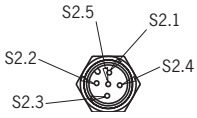
Result: The desired cable length l_1 of 40 m is below the permitted value from the table. The overall length of the switch chain l_{max} of 140 m is less than the maximum value of 200 m.

➡ The planned application is therefore functional in this form.

Connector assignment safety switch CET-AR with plug connectors 2 x M12

Version without door monitoring output (CET1/2)

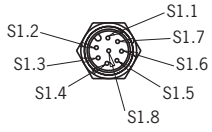
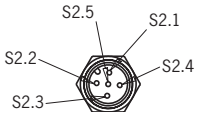
wiring diagram A

Plug connectors (view of connection side)	PIN	Designation	Function	Wire color Connection cable [1]
2 x M12   	S 1.1	IB	Enable input for channel 2	WH
	S 1.2	U_B	Operating voltage AR electronics, 24 V DC	BN
	S 1.3	OA	Safety output, channel 1	GN
	S 1.4	OB	Safety output, channel 2	YE
	S 1.5	OUT	Door monitoring output	GY
	S 1.6	IA	Enable input for channel 1	PK
	S 1.7	0 V U_B	Operating voltage AR electronics 0 V	BU
	S 1.8	RST	Reset input	RD
	S 2.1	0 V U_{CM}	Operating voltage of guard locking solenoid 0 V	BN
	S 2.2	LED 1	LED 1 red, freely configurable, 24 V DC	WH
	S 2.3	LED 2	LED 2 green, freely configurable, 24 V DC	BU
	S 2.4	U_{CM}	Operating voltage of guard locking solenoid, 24 V DC	BK
	S 2.5	Y	Version with feedback loop: If the feedback loop is not used, connect to 24 V DC_B	
		-	Version without feedback loop: This connection must be connected to 0 V.	

1) Only for standard EUCHNER connection cable

Version with door monitoring output (CET3/4)

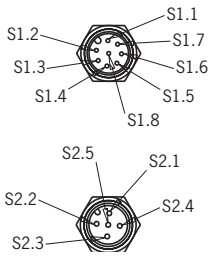
wiring diagram B

Plug connectors (view of connection side)	PIN	Designation	Function	Wire color Connection cable [1]
2 x M12   	S 1.1	IB	Enable input for channel 2	WH
	S 1.2	U_B	Operating voltage AR electronics, 24 V DC	BN
	S 1.3	OA	Safety output, channel 1	GN
	S 1.4	OB	Safety output, channel 2	YE
	S 1.5	OUT	Door monitoring output	GY
	S 1.6	IA	Enable input for channel 1	PK
	S 1.7	0 V U_B	Operating voltage AR electronics 0 V	BU
	S 1.8	RST	Reset input	RD
	S 2.1	0 V U_{CM}	Operating voltage of guard locking solenoid 0 V	BN
	S 2.2	OUT D	Door monitoring output	WH
	S 2.3	LED 1	LED 1 red, freely configurable, 24 V DC	BU
	S 2.4	U_{CM}	Operating voltage of guard locking solenoid, 24 V DC	BK
	S 2.5	Y	Version with feedback loop: If the feedback loop is not used, connect to 24 V DC_B	
		-	Version without feedback loop: This connection must be connected to 0 V.	

1) Only for standard EUCHNER connection cable

Version with door monitoring output (CET3/4), continued

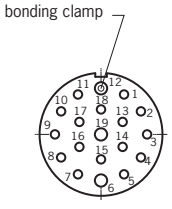
wiring diagram C

Plug connectors (view of connection side)	PIN	Designation	Function	Wire color Connection cable [1]
2 x M12 	S 1.1	IB	Enable input for channel 2	WH
	S 1.2	U_B	Operating voltage AR electronics, 24 V DC	BN
	S 1.3	OA	Safety output, channel 1	GN
	S 1.4	OB	Safety output, channel 2	YE
	S 1.5	OUT	Door monitoring output	GY
	S 1.6	IA	Enable input for channel 1	PK
	S 1.7	0 V U_B	Operating voltage AR electronics 0 V	BU
	S 1.8	RST	Reset input	RD
	S 2.1	0 V U_{CM}	Operating voltage of guard locking solenoid 0 V	BN
	S 2.2	OUT D	Door monitoring output	WH
	S 2.3	OUT	Door monitoring output	BU
	S 2.4	U_{CM}	Operating voltage of guard locking solenoid, 24 V DC	BK
	S 2.5	-	Not used	

1) Only for standard EUCHNER connection cable

Connector assignment safety switch CET-AR with plug connector RC18

wiring diagram D

Plug connectors (view of connection side)	PIN	Designation	Function	Wire color Connection cable [1]
RC18 With screen bonding clamp 	1	U_{CM}	Operating voltage of guard locking solenoid, 24 V DC	VT
	2	IA	Enable input for channel 1	RD
	3	IB	Enable input for channel 2	GY
	4	OA	Safety output, channel 1	RD/BU
	5	OB	Safety output, channel 2	GN
	6	U_B	Operating voltage AR electronics, 24 V DC	BU
	7	RST	Reset input	GY/PK
	8	OUT D	Door monitoring output (only CET3-AR and CET4-AR)	GN/WH
	9	-	n.c.	YE/WH
	10	OUT	Door monitoring output	GY/WH
	11	-	n.c.	BK
	12	FE	Function earth	GN/YE
	13	Y	Version with feedback loop: if the feedback loop is not used, connect to 24 V DC	
		-	Version without feedback loop: This connection must be connected to 0 V.	
	14	-	n.c.	BN/GY
	15	LED 1	LED 1 red, freely configurable, 24 V DC	BN/YE
	16	LED 2	LED 2 green, freely configurable, 24 V DC	BN/GN
	17	-	n.c.	WH
	18	0V U_{CM}	Operating voltage of guard locking solenoid 0 V	YE
	19	0V U_B	Operating voltage AR electronics 0 V	BN

1) Only for standard EUCHNER connection cable

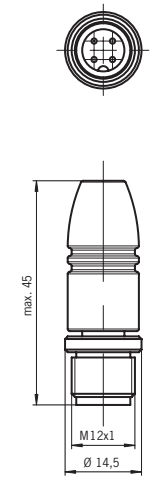
Connector assignment Y-distributor

(Only for version with plug connectors 2 x M12)

Connector assignment
Safety switch CET-AR
(plug S1, 8-pin, plug)
and
Y-distributor (8-pin, socket)

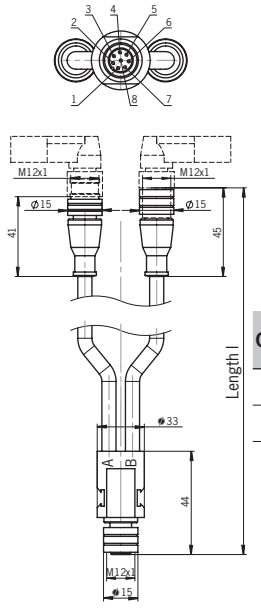
Pin	Function
1	IB
2	U_B
3	OA
4	OB
5	OUT
6	IA
7	0 V
8	RST

Bridging plug 097645
4-pin , plug
(figure similar)



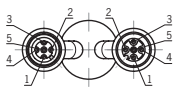
Y-distributor
with connection cable
111696 or 112395

Socket



Order No.	Length l [mm]
111696	200
112395	1000

Plug



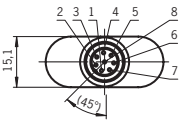
Socket

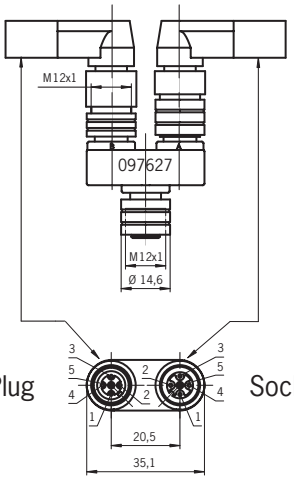
Pin	Function
1	U_B
2	OA
3	0 V
4	OB
5	RST

Pin	Function
1	U_B
2	IA
3	0 V
4	IB
5	RST

Y-distributor
097627

Socket





Plug Socket

Pin	Function
1	U_B
2	OA
3	0 V
4	OB
5	RST

Pin	Function
1	U_B
2	IA
3	0 V
4	IB
5	RST

Connection of a single CET-AR

If a single CET-AR is used, connect the device as shown in Figure 4 to Figure 11. The monitoring output OUT and, if available, the door monitoring output OUT D can be connected to a control system.

The switches can be reset via the RST input. To do this, a voltage of 24 V is applied to the RST input for at least 3 seconds. The RST input must be connected to 0 V if it is not used.

Warning!

In case of an error, loss of the safety function through incorrect connection.

- To ensure safety, both safety outputs (OA and OB) must always be evaluated. Single-channel use of the safety outputs leads to a loss of the category in accordance with EN ISO 13849-1.

Important:

The subsystem CET-AR complies with PL e in accordance with EN 13849-1. To integrate the subsystem in a category 3 or 4 structure, it is necessary to monitor the downstream load (the feedback loop must be monitored).
These examples show only an excerpt that is relevant for connection of the CET system. The example illustrated here does not show complete system planning. The user is responsible for safe integration in the overall system.

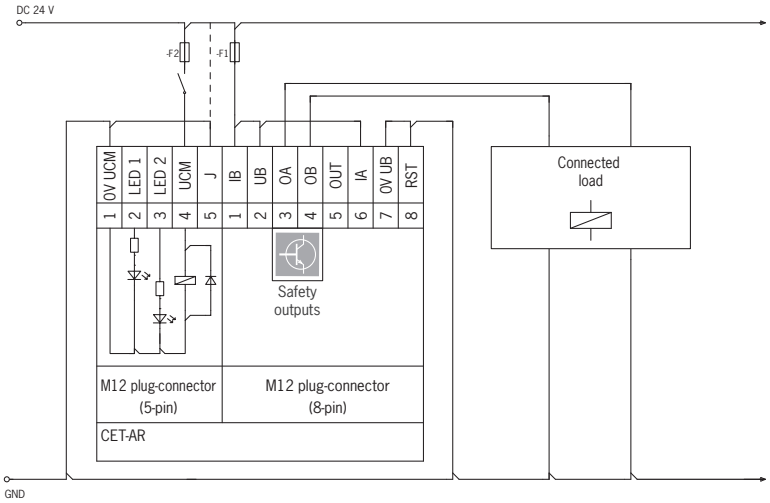


Fig. 4: Connection example for separate operation, version with teach-in input and plug connectors 2 x M12

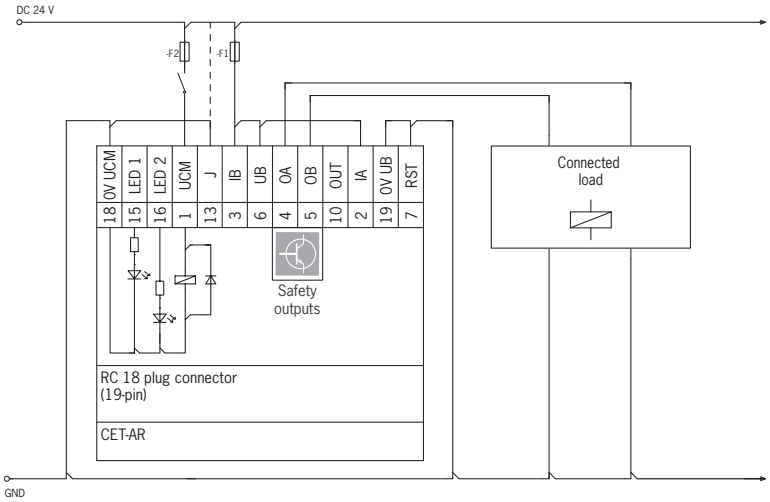


Fig. 5: Connection example for separate operation, version with teach-in input and plug connector RC18

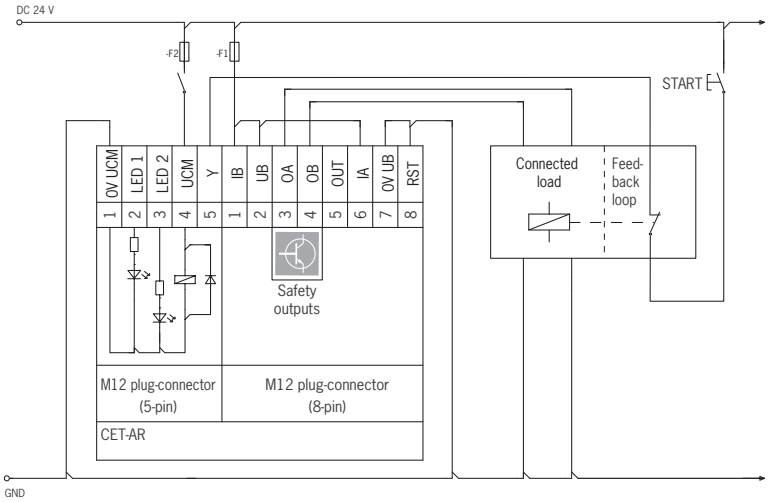


Fig. 6: Connection example for separate operation, version with start button, feedback loop and plug connectors 2 x M12

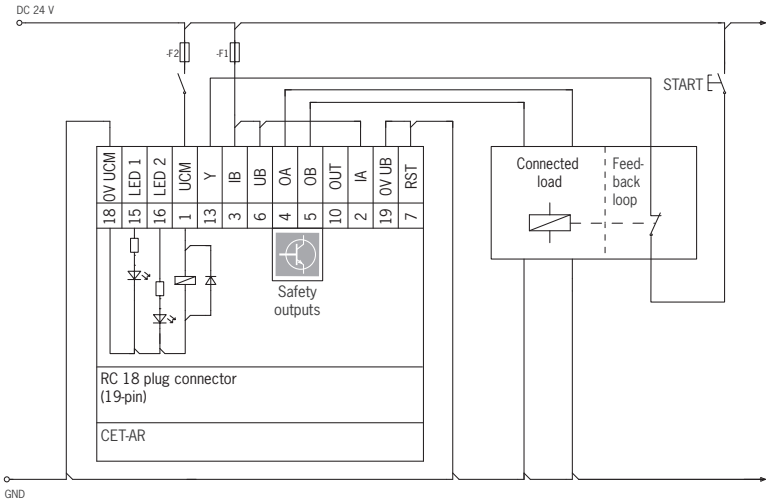


Fig. 7: Connection example for separate operation, version with start button, feedback loop and plug connector RC18

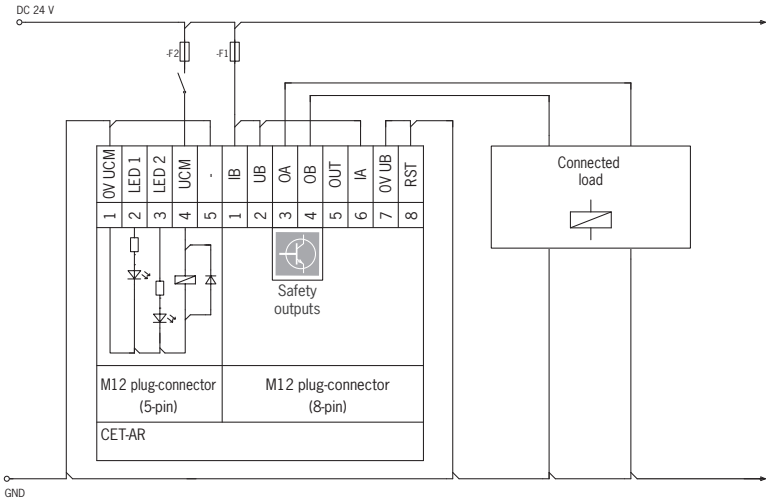


Fig. 8: Connection example for separate operation, version without start button and feedback loop and without teach-in input with plug connectors 2 x M12

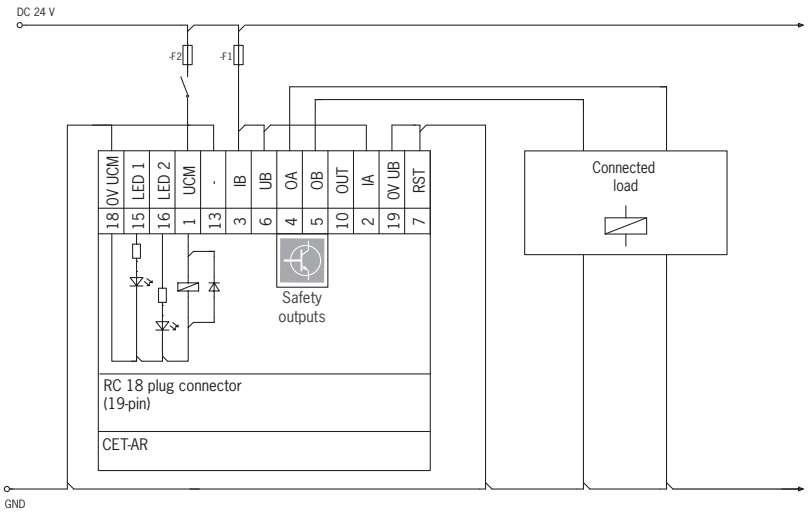


Fig. 9: Connection example for separate operation, version without start button and feedback loop and without teach-in input with plug connector RC18

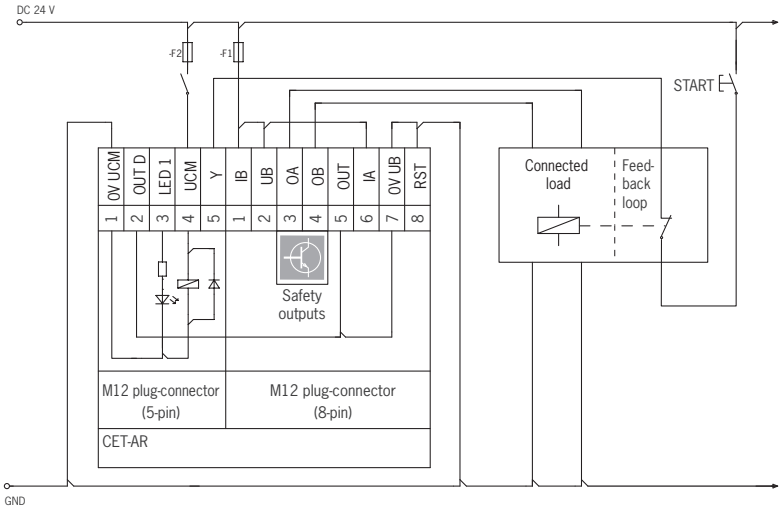


Fig. 10: Connection example for separate operation, version with door monitoring output, start button, feedback loop and plug connectors 2 x M12

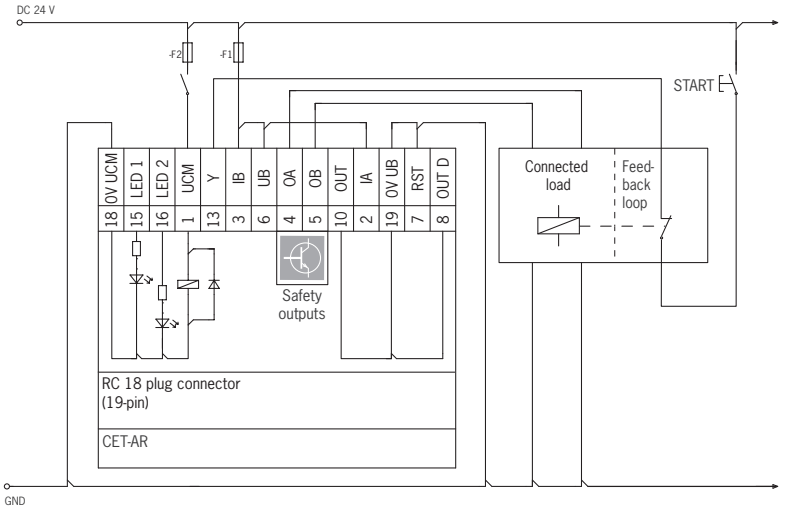


Fig. 11: Connection example for separate operation, version with door monitoring output, start button, feedback loop and plug connector RC18

Connection of several CET-AR in a switch chain

Important:

- An AR switch chain may contain a maximum of 20 safety switches.
- If more than 11 devices are connected in series, the PFHd can be calculated using one of the methods stated in EN ISO 13849-1:2008, Section 4.5.1.
- If the simplified method according to Section 6.3 of EN ISO 13849:2008-12 is used for validation, the Performance Level (PL) might be reduced when more than 11 devices are connected in series.

Important:

The subsystem CET-AR complies with PL e in accordance with EN 13849-1. To integrate the subsystem in a category 3 or 4 structure, it is necessary to monitor the downstream load (the feedback loop must be monitored).
On the use of the CET-AR with feedback loop, this switch must be in the last position in the switch chain (see Figure 12).
These examples show only an excerpt that is relevant for connection of the CET system. The example illustrated here does not show complete system planning. The user is responsible for safe integration in the overall system.

The series connection is shown here based on the example of the version with plug connectors 2 x M12. The series connection of the version with plug connector RC18 has similar behavior, but is realized using additional terminals in a control cabinet.

The switches in the version with plug connectors 2 x M12 are connected one after the other with the aid of pre-assembled connection cables and Y-distributors. If a safety guard is opened or if a fault occurs on one of the switches, the system shuts down the machine. A higher level control system cannot, however, detect which safety guard is open or on which switch a fault has occurred with this connection technology.

The safety outputs are permanently assigned to the respective safety inputs of the downstream switch. OA must be connected to IA and OB to IB. If the connections are interchanged (e.g. OA to IB), the unit will switch to fault state.

Always use input RST in series connections. All switches in a chain can be reset at the same time with this reset input. To do this, a voltage of 24 V must be applied to the RST input for at least 3 seconds. If input RST is not used in your application, it should be connected to 0 V.

Note the following on this aspect:

- A common signal must be used for all switches in the chain. This can be a changeover switch or the output of a control system. A button is not suitable because Reset must always be connected to GND during operation (see switch S11 in Figure 12).
- Reset must always be performed simultaneously for all switches of the chain.

Information on operation in a mixed AR switch chain

The safety switch CET-AR has a longer risk time than a CES-AR switch (see section *Technical data* and *Typical system times*).

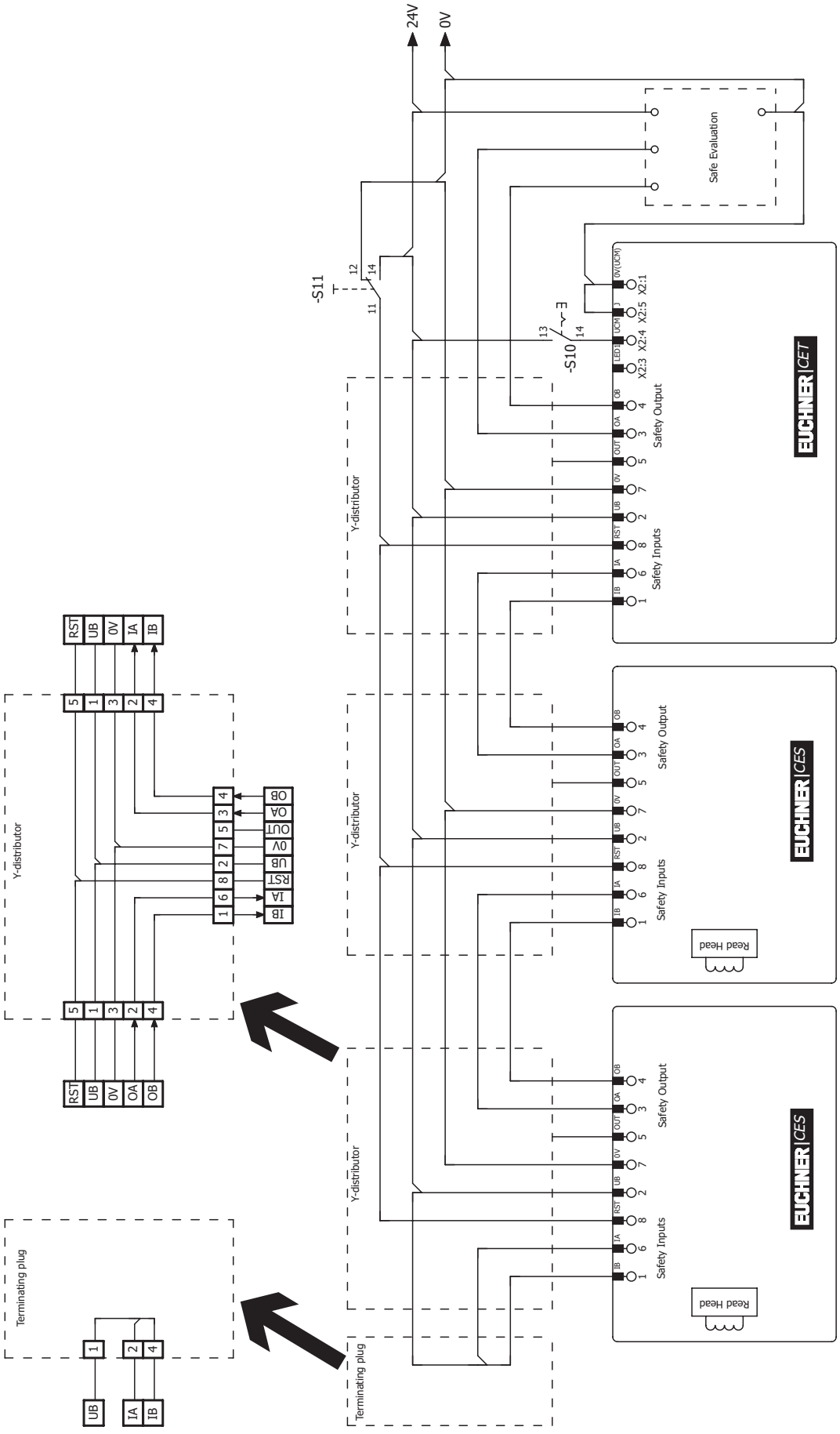


Fig. 12: Connection example for series connection with reset and changeover switch.

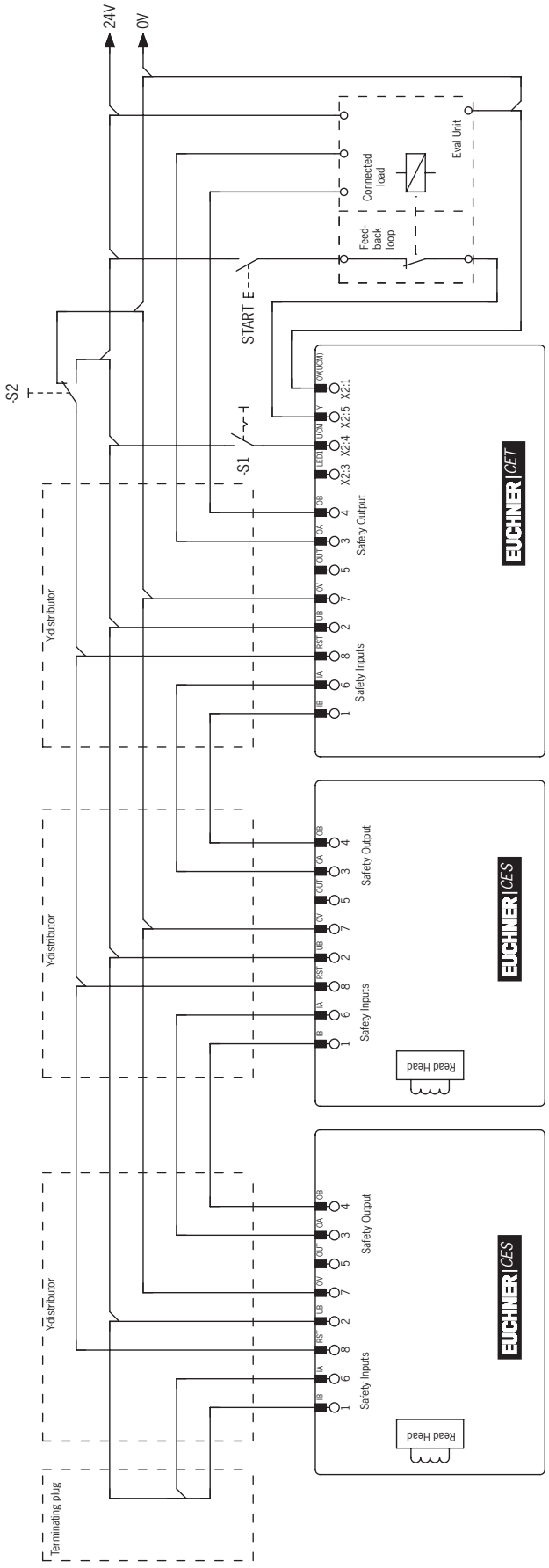


Fig. 13: Connection example for operation in a CES-AR switch chain, version with start button and feedback loop

Information on operation on an AR evaluation unit

The following devices can be operated on an AR evaluation unit.

Device	Version number
CET1/2	from V1.1.2
CET3/4	from V1.0.0

Important:

- Devices with start button and feedback loop are not suitable for connection to an AR evaluation unit.

Please refer to the system manual for the relevant AR evaluation unit for more information. Devices that do not have a version number yet are not suitable for this.

Devices without door monitoring output (CET1/2) each occupy one monitoring output on the AR evaluation unit (HIGH with active guard locking).

Devices with door monitoring output (CET3/4) each occupy two monitoring outputs on the AR evaluation unit. The first monitoring output signals the door position (HIGH when door is closed). The second monitoring output signals the position of guard locking (HIGH when guard locking is active).

Notes on operation with safe control systems

Important:

Devices with start button and feedback loop are not suitable for connection to safe control systems.

Please observe the following requirements for connection to safe control systems:

- Use a common power supply for the control system and the connected safety switches.
- A clocked power supply must not be used for UB. Tap the supply voltage directly from the power supply unit. If the supply voltage is connected to a terminal of a safe control system, this output must provide sufficient electrical current.
- Always connect inputs IA and IB directly to a power supply unit or to outputs OA and OB of another EUCHNER AR device (series connection). Clocked signals must not be present at inputs IA and IB.
- Outputs OA and OB can be connected to the safe inputs of a control system. Prerequisite: The input must be suitable for clocked safety signals (OSSD signals, e.g. from light curtains). The control system must tolerate clock pulses on the input signals. This normally can be set up by parameter assignment in the control system. Observe the notes of the control system manufacturer. For the pulse duration of your safety switch, please refer to the section Typical system times on page 39.
- The following applies for single-channel control of the guard locking: The guard locking (0V UMC) and the control system must have the same weight.
- For two-channel control of the solenoid voltage by safe outputs of a control system, the following points must be observed (see also Figure 14):
  - If possible, switch off the pulsing of the outputs in the control system.
  - For devices with teach-in input J, the input must remain unswitched in normal operation.
  - Freely controllable LEDs may only be switched in parallel to the solenoid (i.e. the LED indicates whether the solenoid is energized).

A detailed example of connecting and setting the parameters of the control system is available for many devices at www.euchner.de in the download area » Applikationen » CET. The features of the respective device are dealt with there in greater detail.

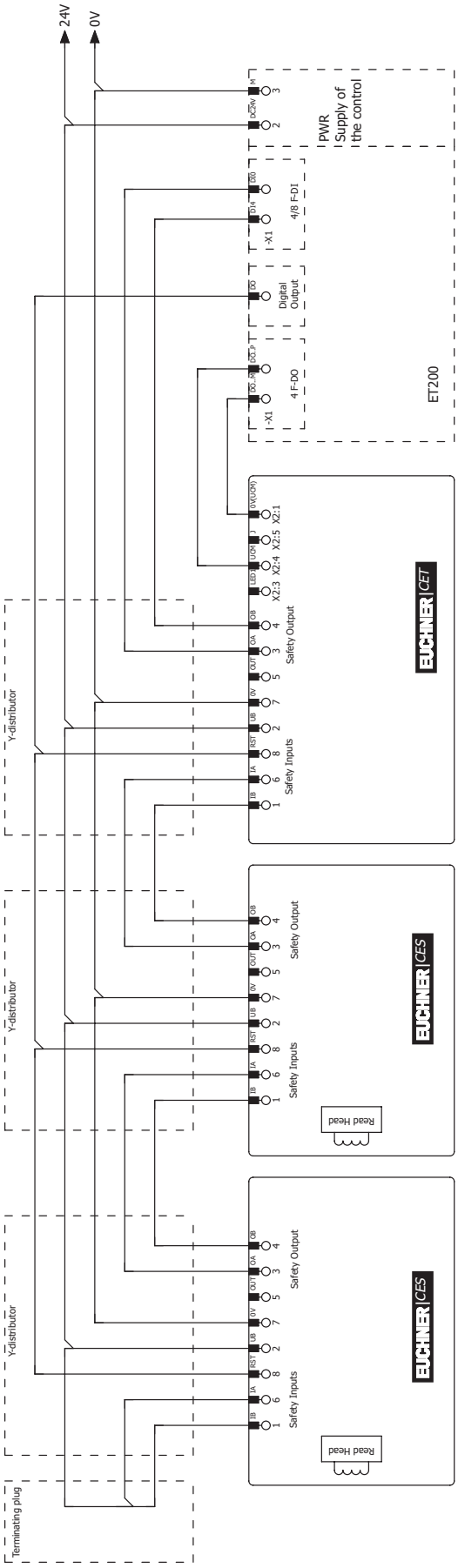
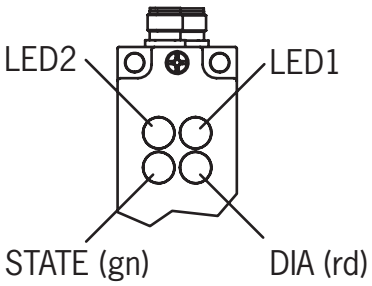


Fig. 14: Connection example for mixed series connection (2 x CES and 1 x CET) on ET200

Setup



LED indicators

LED	Color	State	Significance
STATE	green	illuminated	Normal operation
		flashing	Power Up (further signal functions: see status table)
DIA	red	illuminated	- Internal electronics fault - Fault at the inputs/outputs
LED 1	red	freely configurable*	
LED 2	green	freely configurable*	

*) Can vary depending on version. See data sheet.

Initial setup

1. Apply operating voltage to the safety switch.

➡ The green LED flashes quickly (approx. 10 Hz).
A self-test is performed during this time (approx. 8 s). After this, the LED flashes cyclically one time and signals that it is in standby state.

2. Move actuator to the read head (observe distance < S_{ao}).

➡ The green LED illuminates continuously and indicates the detection of the actuator.

Functional check

Warning!

Danger of fatal injury as a result of faults in installation and functional check.
- Before carrying out the functional check, make sure that there are no persons in the danger area.
- Observe the valid accident prevention regulations.

Mechanical function test

The actuator must slide easily into the recess on the actuating head. Close the safety guard several times to check the function.

Electrical function test

After installation and any fault, the safety function must be fully checked. Proceed as follows:

1. Switch on operating voltage.

➡ The machine must not start automatically.

➡ The safety switch carries out a self-test. The green LED STATE flashes for 8 s with 10 Hz. The green LED STATE then flashes at regular intervals.

2. Close all safety guards. Guard locking by solenoid force: Activate guard locking.

➡ The machine must not start automatically. It must not be possible to open the safety guard.

➡ The green STATE LED illuminates continuously.

3. Enable operation in the control system.

➡ It must not be possible to deactivate the guard locking as long as operation is enabled.

4. Disable operation in the control system and deactivate guard locking.

➡ The safety guard must remain locked until there is no longer any risk of injury.

➡ It must not be possible to start the machine as long as the guard locking is deactivated.

Repeat steps 2-4 for each safety guard.

System status table

Operating mode	Actuator/door position	Safety outputs OA and OB	Monitoring output OUT	Door monitoring output OUT D (only CET3 and CET4)	LED indicator output: STATE (green)	LED indicator output: DIA (red)	State
Self-test	X	off	off	off	10 Hz (8 s)	○	Self-test after power up
Normal operation	closed	on	on	on		○	Normal operation, door closed and locked
	closed	off	on	on	1 x inverse	○	Normal operation, door closed and locked, safety outputs not switched because: - Preceding device in the switch chain signals "door open" (only with series connection) - Feedback loop not closed
	closed	off	off	On	1 x	○	Normal operation, door closed and **not** locked
	open	off	off	off	1 x	○	Normal operation, door open
Fault display	X	off	off	off	2 x		Input fault (e.g. missing test pulses, illogical switch state from previous switch in the switch chain)
	X	off	off	off	4 x		Output fault (e.g. short circuit, loss of switching ability)
	X	off	off	off	5 x		Internal fault (e.g. component fault, data error or short circuit at the outputs)
	X	off	off	off	X	X	Internal fault

Key to symbols	
○	LED not illuminated
	LED illuminated
10 Hz (8 s)	LED flashes for 8 seconds at 10 Hz
3 x	LED flashes three times
X	Any state

After the cause has been remedied, faults can generally be reset by opening and closing the door. If the fault is still displayed afterward, use the reset function or briefly interrupt the power supply. Please contact the manufacturer if the fault could not be reset after restarting.

Important:

If you do not find the displayed device status in the System status table, this indicates an internal device fault. In this case, you should contact the manufacturer.

Technical data

Note:

If a product data sheet is included with the product, the information on the data sheet applies in case of discrepancies with the operating instructions.

Technical data for safety switch CET.-AR-C..-CH-...

Parameter		Value min.	Value typ.	Value max.	Unit
General					
Material, slide		Stainless steel			
Material, safety switch housing		Die-cast aluminum			
Installation position		Any (recommendation: switch head downward)			
Degree of protection	with plug connector M12	IP67			
	with plug connector RC18	IP65			
		(screwed tight with the related mating connector)			
Safety class		III			
Degree of contamination		3			
Mechanical life		1×10^6 operating cycles			
Ambient temperature at U_B		-20	-	+55	°C
Actuator approach speed, max.		20			m/min
Locking force F_{max}		6500			N
Locking force F_{Zh} in acc. with GS-ET-19		$F_{Zh} = F_{max}/1.3 = 5000$			N
Weight		approx. 1.0			kg
Degrees of freedom (actuator in recess) X, Y, Z		X, Y ± 5; Z ± 4			mm
Connection type (depending on version)		2 plug connectors M12, 5 and 8-pin 1 plug connector RC 18, 19-pin (as yet no UL approval)			
Operating voltage U_B (reverse polarity protected, regulated, residual ripple < 5%)		24 ± 15% (PELV)			V DC
Current consumption I_B		80			mA
For the approval according to UL the following applies		Operation only with UL class 2 power supply, or equivalent measures			
Switching load according to UL		DC 24 V, class 2			
External fuse (operating voltage U_B)		0.25	-	2	A
External fuse (solenoid operating voltage U_{CM})		0.5	-	8	A
Rated insulation voltage U_i		-	-	75	V
Resilience to vibration		In acc. with EN 60947-5-2			
EMC protection requirements		In acc. with EN IEC 60947-5-3			
Safety outputs OA/OB		Semiconductor outputs, p-switching, short circuit-proof			
- Output voltage U_{OA}/U_{OB} [1]					
HIGH	U_{OA}/U_{OB}	U_B - 1.5	-	U_B	V DC
LOW	U_{OA}/U_{OB}	0	-	1	
Switching current per safety output		1	-	200	mA
Utilization category according to EN 60947-5-2		DC-13 24V 200mA Caution: outputs must be protected with a free-wheeling diode in case of inductive loads			
Switching frequency		0.5			Hz
Repeat accuracy R acc. to EN IEC 60947-5-3		≤ 10			%
Monitoring outputs OUT and OUT D (optional)		p-switching, short circuit-proof			
Output voltage		0.8 x U_B	-	U_B	V DC
Max. load		-	-	50	mA
Teach-in input J or input feedback loop Y					
HIGH		15	-	U_{CM}	V
LOW		0	-	1	
Solenoid					
Solenoid operating voltage U_{CM} (reverse polarity protected, regulated, residual ripple < 5%)		DC 24 V +10%/-15%			
Current consumption solenoid I_{CM}		480			mA
Power consumption		10			W
Duty cycle		100			%
Freely configurable LEDs [2]		**LED1 red, LED2 green**			
Operating voltage		20.4	-	26.4	V DC
Reliability values according to EN ISO 13849-1		**Head downward or horizontal**		**Head upward**	
Category		4		3	
Performance Level (PL)		e		e	
PFH_d		3.1×10^{-9} / h		4.29×10^{-8} / h	
Mission time		20		20	years

1) Values at a switching current of 50 mA without taking into account the cable lengths.
2) Can vary depending on version. See data sheet.

Typical system times

The specified times are maximum values for AR switch chains with 20 devices. Individual devices have shorter system times.

Ready delay: After switching on, the unit carries out a self-test for 8 s. The system is ready for operation only after this time.

Switch-on time of safety outputs: The max. reaction time from the moment when the safety guard is locked to the moment when the safety outputs switch on T_{on} is 400 ms.

Simultaneity monitoring, safety inputs IA/IB: If the safety inputs have different switching states for longer than 150 ms, the safety outputs OA/OB will be switched off. The devices switches to fault state.

Risk time according to EN 60947-5-3: If an actuator moves outside the operating distance, the safety outputs OA and OB are deactivated after a maximum of 500 ms.

Difference time: The safety outputs OA and OB switch with a slight time offset. They have the same signal state at the latest after a difference time of 10 ms.

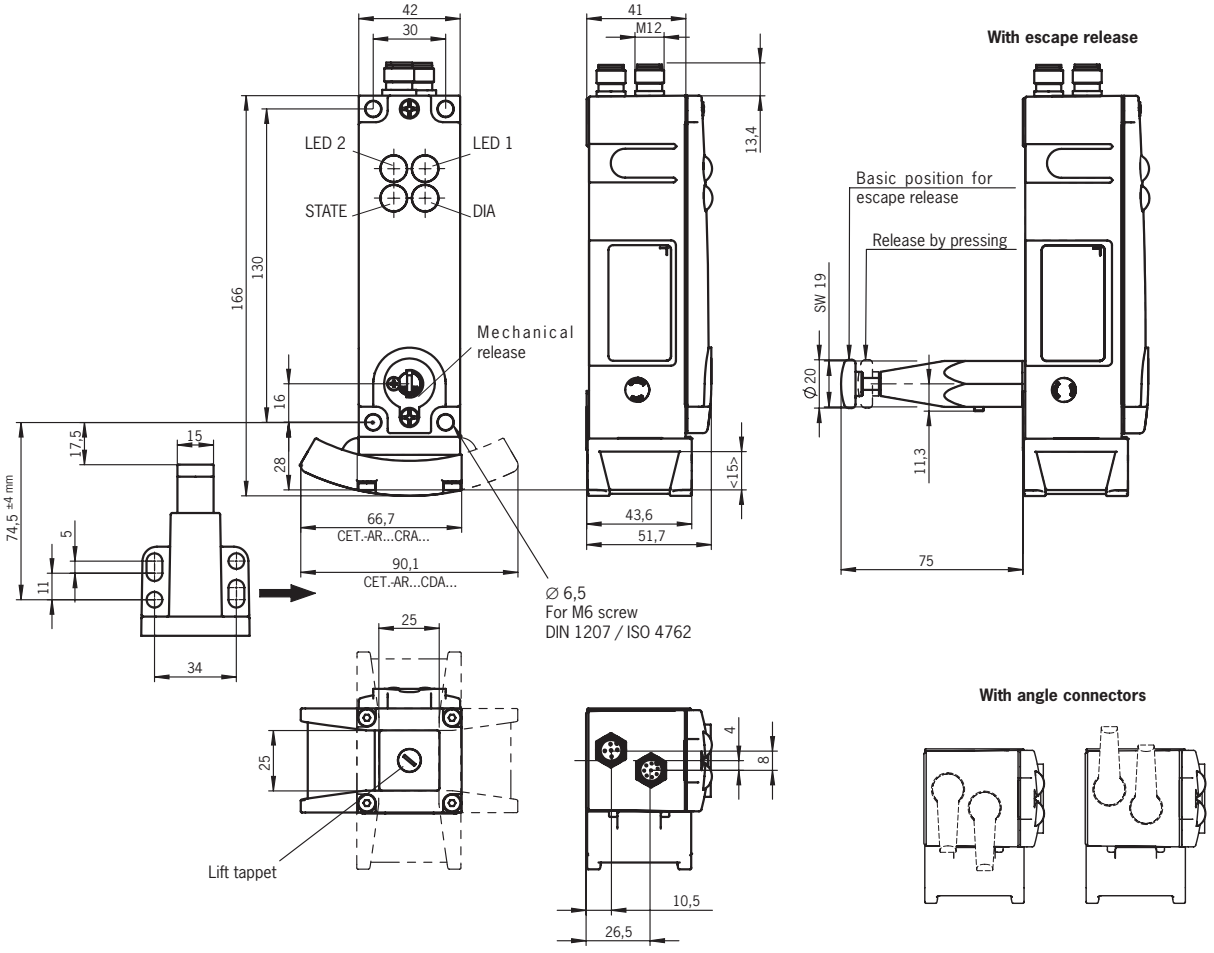
Clock pulses at the safety outputs: The device generates its own clock signal on the output lines OA/OB. A downstream control system must tolerate these pulses, which may have a length of up to 1 ms.

This can usually be set up in the control systems by parameter assignment. If parameter assignment is not possible for your control system or if shorter clock pulses are required, please contact our support organization.

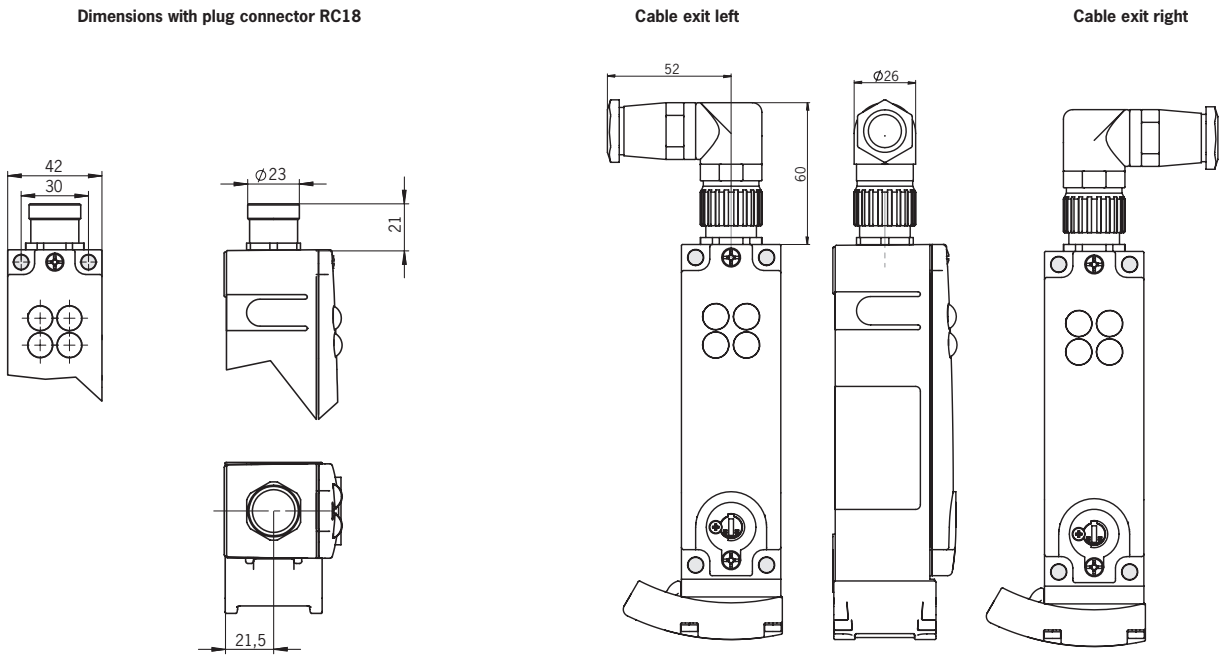
The pulses are also output when the safety outputs are switched off.

Dimension drawing safety switch CET-AR-...

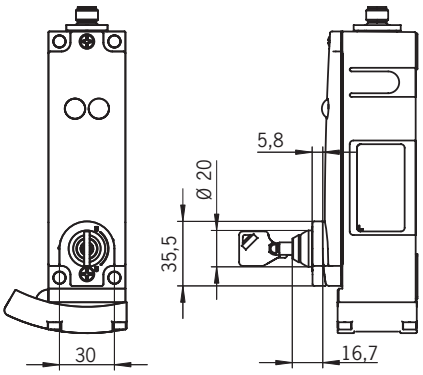
Version with plug connectors 2 x M12



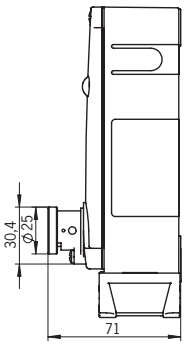
Version with plug connector RC 18



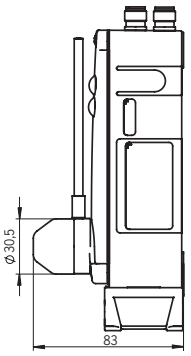
With mechanical key release



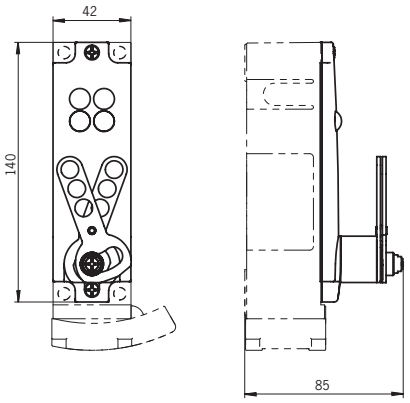
With emergency unlocking



With front wire release



With lockout mechanism

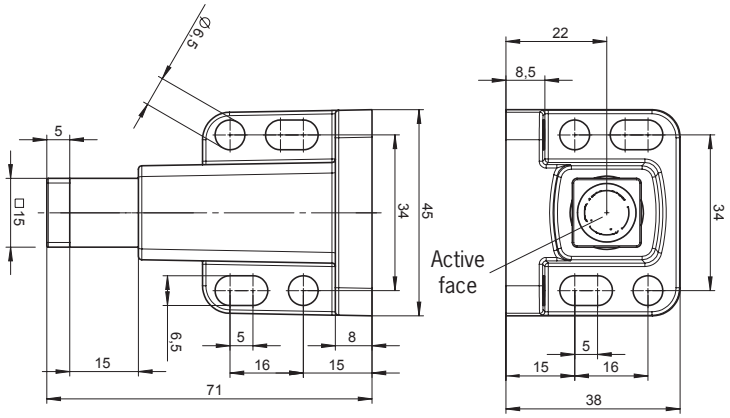


Technical data for actuator CET-A-BWK-50X

Parameter	Value			Unit
	min.	typ.	max.	
Housing material	Stainless steel			
Stroke max.	15			mm
Weight	0.25			kg
Ambient temperature	- 20	-	+ 55	°C
Degree of protection acc. to EN IEC 60529	IP 67			
Mechanical life	1 x 10^6 operating cycles			
Locking force, max.	6,500			N
Installation position	Active face opposite switch head			
Power supply	Inductive via switch			
Dwell time [1]	0.5	-	-	s

1) The dwell time is the time that the actuator must be inside or outside the operating distance.

Dimension drawing actuator CET-A-BWK-50X



Tip!

Safety screws are included with the actuator.

Ordering Information and Accessories

Versions with plug connectors 2 x M12

Order No./item	Closed-circuit current principle	Open-circuit current principle	Door monitoring output	Unicode	Multicode	Single insertion slide	Double insertion slide	Teach-in input	Feedback loop	Escape release	Wire front release	Lockout mechanism	Wiring diagram
CET1													
106275 CET1-AR-CDA-AH-50X-SG-106275	●			●			●	●					A
106616 CET1-AR-CRA-AH-50A-SG-106616	●			●		●			●	● 75 mm			A
106159 CET1-AR-CRA-AH-50F-SG-106159	●			●		●		●		● 75 mm			A
111766 CET1-AR-CRA-AH-50F-SG-C2333-111766	●			●		●		●		● 75 mm		●	A
105802 CET1-AR-CRA-AH-50S-SG-105802	●			●		●			●				A
103418 CET1-AR-CRA-AH-50X-SG-103418	●			●		●		●					A
112121 CET1-AR-CRA-AH-50X-SG-C2333-112121	●			●		●		●				●	A
113320 CET1-AR-CRA-AH-50S-SG-C2290-113320	●			●		●			●		● 6 m		A
110241 CET1-AR-CRA-CH-50F-SG-110241	●				●	●				● 75 mm			A
105764 CET1-AR-CRA-CH-50S-SG-105764	●				●	●			●				A
105763 CET1-AR-CRA-CH-50X-SG-105763	●				●	●							A
109231 CET1-AR-CDA-CH-50X-SG-109231	●				●		●						A
113272 CET1-AR-CRA-CH-50F-SG-C2333-113272	●				●	●				● 75 mm		●	A
CET2													
109075 CET2-AR-CRA-AH-50S-SG-109075		●		●		●			●				A
110240 CET2-AR-CRA-AH-50X-SG-110240		●		●		●		●					A
109941 CET2-AR-CRA-CH-50F-SG-C2312-109941		●			●	●				● 105 mm			A
110082 CET2-AR-CRA-CH-50X-SG-110082		●			●	●							A

Versions with plug connectors 2 x M12 (continued)

Order No./item	Closed-circuit current principle	Open-circuit current principle	Door monitoring output	Unicode	Multicode	Single insertion slide	Double insertion slide	Teach-in input	Feedback loop	Escape release	Wire front release	Lockout mechanism	Wiring diagram
CET3													
109401 CET3-AR-CRA-AH-50X-SG-109401	●		●	●		●		●					B
113139 CET3-AR-CRA-AH-50X-SG-C2290-113139	●		●	●		●		●			● 4 m		B
114512 CET3-AR-CRA-AH-50X-SG-C2333-114512	●		●	●		●		●				●	B
113965 CET3-AR-CRA-AH-50F-SG-113965	●		●	●		●		●		● 75 mm			B
114508 CET3-AR-CRA-AH-50F-SG-C2357-114508	●		●	●		●		●		● 75 mm		●	B
110114 CET3-AR-CRA-CH-50X-SG-C2290-110114	●		●		●	●					● 4 m		B
110905 CET3-AR-CRA-CH-50F-SG-C2290-110905	●		●		●	●				● 75 mm	● 4 m		B
110906 CET3-AR-CRA-CH-50X-SG-110906	●		●		●	●							B
110907 CET3-AR-CRA-CH-50F-SG-110907	●		●		●	●				● 75 mm			B
112921 CET3-AR-CRA-CH-50F-SG-C2333-112921	●		●		●	●				● 75 mm		●	B
112992 CET3-AR-CRA-CH-50S-SG-112992	●		●		●	●			●				B
113958 CET3-AR-CRA-CH-50F-SG-C2357-113958	●		●		●	●				● 105 mm		●	B
114090 CET3-AR-CDA-CH-50F-SG-114090	●		●		●		●						B
CET4													
111683 CET4-AR-CRA-AH-50X-SG-111683		●	●	●		●		●					B
111684 CET4-AR-CRA-CH-50X-SG-111684		●	●		●	●							B
113767 CET4-AR-CRA-CH-50X-SG-C2333-113767		●	●		●	●						●	B
114650 CET4-AR-CRA-CH-50F-SG-114650		●	●		●	●				● 75 mm			B
113081 CET4-AR-CRA-CH-50S-SG-113081		●	●		●	●			●				B
114712 CET4-AR-CDA-CH-50X-SG-114712		●	●		●		●						B
113609 CET4-AR-CRA-CH-50X-SG-C2355-113609		●	●		●		●						C

Connection cables M12 and accessories for series connection

Designation	Cable length [m]/version	Order no./item
Connection cable M12 PVC, flying lead 8-pin	5	**100177**
	10	**100178**
	20	**100179**
Connection cable M12 for solenoid PVC, flying lead 5-pin	5	**100183**
	10	**100184**
	20	**100185**
Bridging plug	M12 plug connector 4-pin	**097645** Bridging plug
Y-distributor M12	M12, 1 x 8-pin, 2 x 5-pin	**097627** Y-distributor M12
Y-distributor M12 with connecting cable	M12, 1 x 8-pin, 2 x 5-pin	**111696** Y-distributor M12 with connecting cable

Versions with plug connector RC18

Important: Versions with plug connector RC-18 do not yet have UL approval.

Order No./item	Closed-circuit current principle	Open-circuit current principle	Door monitoring output	Unicode	Multicode	Single insertion slide	Double insertion slide	Teach-in input	Feedback loop	Escape release	Wire front release	Lockout mechanism	Wiring diagram
CET1													
110203 CET1-AR-CRA-AH-50X-SH-110203	●			●		●		●					D
113022 CET1-AR-CRA-AH-50X-SH-C2290-113022	●			●		●		●			● 4 m		D
113021 CET1-AR-CRA-AH-50F-SH-C2353-113021	●			●		●		●		● 105 mm	● 4 m		D
110943 CET1-AR-CRA-AH-50F-SH-C2312-110943	●			●		●		●		● 105 mm			D
110204 CET1-AR-CRA-CH-50X-SH-110204	●				●	●							D
113255 CET1-AR-CRA-CH-50X-SH-113255	●				●		●						D
CET2													
110205 CET2-AR-CRA-AH-50X-SH-110205		●		●		●		●					D
112466 CET2-AR-CDA-AH-50X-SH-112466		●		●			●	●					D
110206 CET2-AR-CRA-CH-50X-SH-110206		●			●	●							D
CET3													
110103 CET3-AR-CRA-AH-50X-SH-110103	●		●	●		●		●					D
111725 CET3-AR-CRA-AH-50F-SH-C2312-111725	●		●	●		●		●		● 105 mm			D
113024 CET3-AR-CRA-AH-50X-SH-C2290-113024	●		●	●		●		●			● 4 m		D
113023 CET3-AR-CRA-AH-50F-SH-C2353-113023	●		●	●		●		●		● 105 mm	● 4 m		D
113151 CET3-AR-CRA-AH-50X-SH-C2333-113151	●		●	●		●		●				●	D
114088 CET3-AR-CRA-AH-50X-SH-C2290-114088	●		●	●		●		●			● 6 m		D
114505 CET3-AR-CRA-AH-50F-SH-C2333-114505	●		●	●		●		●		● 75 mm		●	D
113148 CET3-AR-CRA-AH-50F-SH-113148	●		●	●		●		●		● 75 mm			D
114647 CET3-AR-CDA-AH-50F-SH-114647	●		●	●			●	●		● 75 mm			D
110104 CET3-AR-CRA-CH-50X-SH-110104	●		●		●	●							D
CET4													
110201 CET4-AR-CRA-AH-50X-SH-110201		●	●	●		●		●					D
110202 CET4-AR-CRA-CH-50X-SH-110202		●	●		●	●			●				D
116285 CET4-AR-CRA-AH-50F-SH-116285		●	●		●	●				● 75 mm			D

Connection cables RC18

Designation	Cable length [m]	Order no./item
Female plug RC18 with cable PUR for CET-AR 18-pin + PE	1.5	**092761** RC18EF1,5M-C1825
	3	**092816** RC18EF3M-C1825
	6	**077014** RC18EF6M-C1825
	8	**077015** RC18EF8M-C1825
	10	**092898** RC18EF10M-C1825
	15	**077016** RC18EF15M-C1825
	20	**092726** RC18EF20M-C1825
	25	**092727** RC18EF25M-C1825
	30	**095993** RC18EF30M-C1825
Plug connector RC18 with cable halogen-free for CET-AR 18-pin + PE	1.5	**092883** RC18EF1,5MF-C1825
	3	**092884** RC18EF3MF-C1825
	6	**092885** RC18EF6MF-C1825
	8	**092886** RC18EF8MF-C1825
	10	**092887** RC18EF10MF-C1825
	15	**092888** RC18EF15MF-C1825
	20	**092889** RC18EF20MF-C1825
	25	**092890** RC18EF25MF-C1825

Accessories

Designation	Use	Version	Order No./item
Mechanical key release	for safety switch CET	identical locking, incl. 2 keys	**098850** Mechanical key release
Replacement key	for mechanical key release, identical locking	2 keys, identical locking	**099434** Replacement key
Emergency unlocking	for safety switch CET	latching in both positions	**103714** Emergency unlocking CET
Cover	for safety switch CET and actuators CET	door hinge right	**098808** CET cover right
		door hinge left	**098807** CET cover left
Mounting plate EMP-L-CET	for safety switch CET		**106695** EMP-L-CET
Mounting plate EMP-B-CET	for actuator CET		**106694** EMP-B-CET
Actuator	for safety switch CET	incl. safety screws	**096327** CET-A-BWK-50X
Safety screws (spare)	for actuator CET	4 x M5 x 16 packaging unit: 100 ea.	**073456** M5 x 16

Tip!

The connection cables given above meet the requirements for connection material according to UL specifications. You will find further connection material, in particular for series connection, in the current *Non-Contact Safety System CES* catalog at www.euchner.de.

Inspection and service

Warning!

Loss of the safety function because of damage to the system.
In case of damage, the entire device must be replaced.
Only accessories or spare parts that can be ordered from EUCHNER may be replaced.

Regular inspection of the following is necessary to ensure trouble-free long-term operation:

- Check the switching function (see section *Functional check*)
- Check all additional functions (e.g. escape release, lockout mechanism, etc.)
- Check the secure fastening of the devices and the connections
- Check for soiling

No servicing is required, repairs to the device are only allowed to be made by the manufacturer.

Note:

The year of manufacture can be seen in the lower right corner of the rating plate. The current version number in the format (V X.X.X) can also be found on the device.

Service

If service support is required, please contact:

EUCHNER GmbH + Co. KG

Kohlhammerstraße 16

D-70771 Leinfelden-Echterdingen

Service telephone:

+49 711 7597-500

E-mail:

info@euchner.de

Internet:

www.euchner.de

Declaration of conformity

More than safety.

CE EUCHNER

EUCHNER GmbH + Co. KG
Kohlhammerstraße 16
70771 Leinfelden-Echterdingen
Germany

EG-Konformitätserklärung
EC-Declaration of Conformity
CE-Déclaration de Conformité
CE-Dichiarazione di conformità
CE-Declaración de Conformidad

Original DE
Translation EN
Traduction FR
Traduzione IT
Traducción ES

Die nachfolgend aufgeführten Produkte sind konform mit den Anforderungen der folgenden Richtlinien (falls zutreffend):
The beneath listed products are in conformity with the requirements of the following directives (if applicable):
Les produits mentionnés ci-dessous sont conformes aux exigences imposées par les directives suivantes (si valable)
I prodotti sotto elencati sono conformi alle direttive sotto riportate (dove applicabili):
Los productos listados a continuación son conforme a los requisitos de las siguientes directivas (si fueran aplicables):

I:	2006/42/EG	Maschinenrichtlinie
	2006/42/EC	*Machinery directive*
	2006/42/CE	*Directive Machines*
	2006/42/CE	*Direttiva Macchine*
	2006/42/CE	*Directiva de máquinas*
II:	2004/108/EG	EMV Richtlinie
	2004/108/EC	*EMC Directive*
	2004/108/CE	*Directive de Compatibilité électromagnétique*
	2004/108/CE	*Direttiva EMV*
	2004/108/CE	*Directiva CEM*

Die Schutzziele der Niederspannungsrichtlinie wurden gemäß Anhang I, Nr. 1.5.1 der Maschinenrichtlinie eingehalten.
The safety objetives of the Low-Voltage Directive comply with Annex I, No. 1.5.1 of the Machinery Directive.
Les objectifs de sécurité de la Directive Basse Tension sont conformes à l'annexe I, No. 1.5.1 de la Directive Machines
Gli obiettivi di sicurezza della Direttiva Bassa Tensione sono conformi a quanto riportato all'allegato I, No. 1.5.1 della Direttiva Macchine.
Los objetivos de seguridad de la Directiva de Bajo Voltaje cumplen con el Anexo I, No. 1.5.1 de la Directiva de Máquinas

Folgende Normen sind angewandt:	a:	EN 60947-5-3:1999 + A1:2005
Following standards are used:	b:	EN 1088: 1995+A2:2008
Les normes suivantes sont appliquées:	c:	EN ISO 13849-1:2008
Vengono applicate le seguenti norme:	d:	EN ISO 13849-2:2008
Se utilizan los siguientes estándares:	e:	EN 50295:1999 (AS-i)

Bezeichnung der Sicherheitsbauteile *Description of safety components* *Description des composants sécurité* *Descrizione dei componenti di sicurezza* *Descripción de componentes de seguridad*	**Type** *Type* *Type* *Tipo* *Typo*	**Richtlinie** *Directives* *Directive* *Direttiva* *Directivas*	**Normen** *Standards* *Normes* *Norma* *Estándares*	**Zertifikats-Nr.** *No. of certificate* *Numéro du certificat* *Numero del certificato* *Número del certificado*	
Sicherheitsschalter *Safety Switches* *Interrupteurs de sécurité* *Finecorsa di sicurezza* *Interruptores de seguridad*	CET1-AR... CET2-AR...	I, II	a, b, c, d	ET 10213	(1)
	CET3-AP...	I, II	a, b, c, d	UQS 113938	(2)
	CET3-AR...	I, II	a, b, c, d	UQS 113325	(2)
	CET4-AP...	I, II	a, b, c, d	UQS 113939	(2)
	CET4-AR...	I, II	a, b, c, d	UQS 113940	(2)
	CET3-AS...	I, II	a, b, c, d, e	UQS 113400	(2)
	CET4-AS...	I, II	a, b, c, d, e	UQS 113971	(2)
Betätiger *Actuator* *Actionneur* *Azionatore* *Actuador*	CET-A-BWK...	I, II	a, b, c, d	ET 10213 UQS 113325	(1) (2)

Benannte Stelle
Notified Body
Organisme notifié
Sede indicata
Entidad citada

(1) NB 0340
DGUV Test Prüf- und Zertifizierungsstelle Fachausschuss Elektrotechnik
Gustav-Heinemann-Ufer 130 - 50968 Köln – Germany
(2) NB 0035
TÜV Rheinland Industrie Service GmbH
Am Grauen Stein - 51105 Köln - Germany

Leinfelden, Oktober 2011

EUCHNER GmbH + Co. KG
Kohlhammerstraße 16
70771 Leinfelden-Echterdingen
Germany

Dipl.-Ing. Michael Euchner
Geschäftsführer
Managing Director
Gérant d'affaires
Direttore Generale
Director Gerente

Duc Binh Nguyen
Dokumentationsbevollmächtigter
Documentation manager
Responsable documentation
Responsabilità della documentazione
Agente documenta

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EUCHNER GmbH + Co. KG Kohlhammerstraße 16 70771 Leinfelden-Echterdingen Tel. +49/711/7597-0 Fax +49/711/753316 www.euchner.de info@euchner.de

Euchner GmbH + Co. KG
Kohlhammerstraße 16
D-70771 Leinfelden-Echterdingen
info@euchner.de
www.euchner.de

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More than safety.

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